

Chemistry I: Solving Molarity Problems

The formulae for molarity problems are:

$$M = \frac{\left(\frac{\# g}{mm} \right)}{L} \quad \text{or} \quad M = \frac{mol.}{L}$$

There are 3 types of problems:

1. the simplest type:

- a. What is the molarity of a solution that has 3 moles of KCl in 5000 mL of solution?

b.
$$M = \frac{3molKCl}{5L} = 0.6MKCl$$

2. to calculate the number of grams of solute to make a solution of known molar concentration

- a. How many grams of NaOH are needed to make 1500 mL of 2.5 M solution?

b.
$$2.5M = \frac{\left(\frac{x}{40g} \right)}{1.5L} = 159gNaOH$$

3. To calculate the molarity of a solution given the amount of compound and the volume of solution.

- a. What is the molarity (M) of a solution that contains 270 grams of $MgSO_4$ in 3000 mL of solution?

b.
$$M = \frac{\left(\frac{270g}{120g} \right)}{3L} = 0.75MMgSO_4$$